

# PATENT ABSTRACTS OF JAPAN

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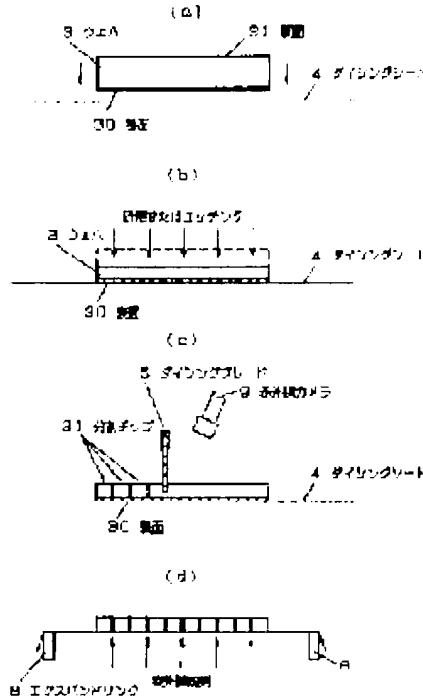
**H01L 21/301**(21) Application number : **05-218333**(71) Applicant : **MATSUSHITA ELECTRIC IND CO LTD**(22) Date of filing : **02.09.1993**(72) Inventor : **SAKAI HIROYUKI**

## (54) Dicing apparatus and method of processing semiconductor chip

### (57) Abstract:

**PURPOSE:** To provide a chip processing method by which a semiconductor chip whose thickness is small can be obtained from a wafer without breaking the wafer even if its thickness is small.

**CONSTITUTION:** A wafer 3 is bonded to a dicing sheet 4 so as to have the wafer 3 front facedown. The thickness of the wafer 3 is reduced in that state and dicing is performed from the rear 31 of the wafer 3 while scribelines on the wafer surface are monitored. With this constitution, it is not necessary to remove the wafer 3 from the dicing sheet 4 after the thickness of the wafer 3 is reduced and, even if the wafer is thin, a semiconductor chip having a small thickness can be obtained without breaking the wafer 3. Further, the number of processes can be reduced.



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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to equipments into which the processing method of a semiconductor chip and a chip with the need of making the thickness of tip thin are processed, such as a transistor for power.

[0002]

[Description of the Prior Art] A semiconductor device/IC is divided into a simple substance chip by chip processing processes, such as a scribe and dicing, and a large number are usually formed on semiconductor wafers, such as Si and GaAs, and it is used, carrying out assembly/mounting of it. The example of the conventional chip processing is explained using a cross section 2. It grinds or \*\*\*\*\*'s in suitable thickness so that it may be easy to process a wafer first. For example, as shown in drawing 2 (a), the front face 30 of a wafer 3 in which the device was formed is pasted up on the polish fixture 1 using electron wax 2 grade, and it thins to the thickness of a request of the thickness of a wafer by grinding or \*\*\*\*\*'ing a rear face. Next, the wafer 3 which thinned by removing the electron wax 2 with a solvent is removed from the polish fixture 1, as shown in this drawing (b), the device forming face (front face) 30 is turned up, and a rear face is stuck on a dicing sheet. Furthermore, as shown in this drawing (c), a wafer is cut along with the scribe line line by which pattern formation was carried out to the wafer front face 30 using usual dicing equipment, and it divides into each chip. In drawing, 5 shows the dicing blade. Although a part of cross section is shown drawing, a wafer is cut by the dicing blade 5 carrying out the configuration of the shape of a usually thin disk, and carrying out high-speed rotation. Next, after extending a sheet at the process called EKUSUPANDO in the dicing sheet with which the divided wafer got and fixing to the EKUSUPANDO ring 8, each semiconductor chip is obtained by pushing up a desired chip in lower shell needle 6 grade, as shown in this drawing (d), dissociating from a dicing sheet, and taking out in vacuum adsorber 7 grade.

[0003] However, the need of making the thickness of tip very thin in fields, such as a power transistor, in recent years for the improvement in thermolysis came out. moreover, grounding formed in the chip rear face also in fields, such as RF MMIC, -- the wiring formed in the conductor and the front face -- thin IC chip of the thickness of tip is needed for impedance adjustment of the microstrip line by the conductor

[0004]

[Problem(s) to be Solved by the Invention] However, especially by the method of the conventional chip processing, when having processed the low compound semiconductor wafer of mechanical strengths, such as GaAs, and wafer \*\* was made thin and a wafer was removed from a polish fixture, it had the problem that a wafer will break at a subsequent process.

[0005] this invention offers the equipment into which the chip processing method and chip which obtain the thin semiconductor chip of the thickness of tip easily are processed, without breaking a wafer in view of the above-mentioned trouble, even if it makes wafer \*\* thin.

[0006]

[Means for Solving the Problem] The equipment with which this invention carries out the monitor of the pattern of the rear face of a wafer in order to solve the above-mentioned trouble. The process which sticks on a dicing sheet the front face of a semiconductor wafer in which the device was formed using dicing equipment equipped with the equipment which cuts a wafer based on the information by which the monitor was carried out with the aforementioned equipment. It has the process which grinds or \*\*\*\*\*'s the rear face of a wafer, sticking the aforementioned semiconductor wafer on the aforementioned sheet, and the process which carries out dicing from a rear face while carrying out the monitor of the surface pattern of the aforementioned semiconductor wafer.

[0007]

[Function] The dicing from the rear face of a wafer becomes possible with the dicing equipment of composition of having described above, therefore it can begin, rear-face [ turning a front face down and having stuck the shell wafer on a dicing sheet ] processing can be attained, the removal process of a wafer can become unnecessary, and this invention can prevent the crack of a wafer, and can cut down a process.

[0008]

[Example] The example of this invention is explained using a cross section 1. Unlike the conventional example, first, as shown in this drawing (a), a front-face 30 side is turned down and a wafer 3 is stuck on the dicing sheet 4. The scribe line pattern for chip division is formed in the front face 31 of a wafer 3 simultaneously with a device. Moreover, it is convenient when the

ultraviolet-rays hardening type sheet with which adhesion declines by UV irradiation as a dicing sheet 4 is used [0009] Next, it thins by Mr. Atsushi of a request of the thickness of a wafer by grinding or \*\*\*~~\*\*\*\*\*~~ing the rear face 31 of a wafer 3, sticking a wafer 3 on the dicing sheet 4, as shown in this drawing (b). At this time, the front-face side of a wafer is protected with the dicing sheet 4.

[0010] Next, although dicing cuts a wafer and being divided into each chip, dicing equipment with the infrared camera of this invention is used at this time. That is, usually, although dicing is cut along with this line, carrying out the monitor of the pattern of the scribe line formed in the wafer front face, by this example, it carries out the monitor of the scribe line formed in the front face 31 of the wafer 3 which is the rear-face side of the wafer seen from dicing equipment using an infrared camera, and cuts a wafer along with this. Thus, what is necessary is just to remove a chip like the conventional example, after carrying out chip division. Removal is easy, if UV irradiation is performed and the adhesion of a dicing sheet is reduced after setting to an EKUSUPANDO ring, as shown in drawing 1 (d).

[0011] As explained above, since it is stuck on a dicing sheet and a wafer is not removed after thinning wafer \*\* until it carries out chip division, even if it makes wafer \*\* thin, by this example, it becomes possible to prevent the crack of a wafer. Moreover, since it begins on the sheet finally used by dicing and the shell wafer is stuck, compared with the part conventional example, a process is reducible.

[0012] In addition, although the dicing sheet itself is used as a wafer surface protection at the time of rear-face polish / etching, you may reinforce with this example further with a wax etc.

[0013] Moreover, although this example does not show, you may process metaled coating, formation of the Bahia hall, etc. into the rear face of the wafer which thinned. The same effect is acquired by processing it, sticking on a dicing sheet also at this time.

[0014]

[Effect of the Invention] As shown above, this invention makes the dicing from the rear face of a wafer possible, by performing rear-face [ turning the start to a wafer down and having stuck the front face on a dicing sheet for it ] processing, can abolish the removal process of a wafer and can prevent the crack of a wafer. Moreover, curtailment of the number of processes can be performed simultaneously.

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